Harbor Communities Monitoring Study

Board Overview

January 25, 2007

Harbor Communities Monitoring Study (HCMS) Goals

Assess community exposure

- Find pollution “Hot Spots”
- Test low-cost easy-to-use monitors
- Determine impacts of local versus regional sources
- Establish baseline for control program effectiveness

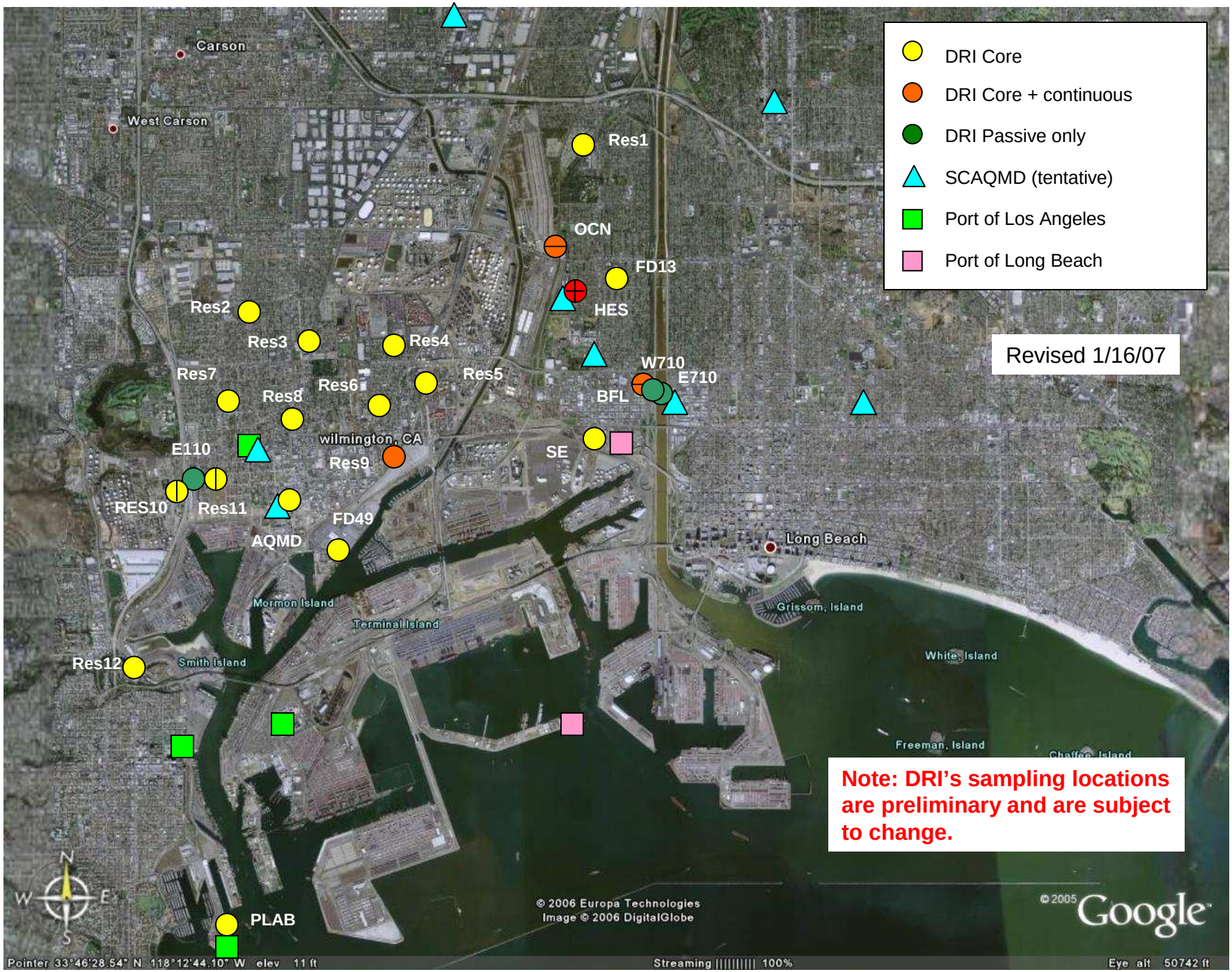
Study Design

- **Harbor Communities**
  - **Wide range of pollution sources**
  - **Residential neighborhoods impacted**
- **Complementary monitoring tools**
  - **Fixed “passive” monitors**
  - **Particle counters**
  - **Mobile monitoring platform**
- **Measure over entire year**
  - **PM2.5 health effects driven by annual average**
  - **Air toxic cancer risk based on long-term exposure**
  - **Meteorology varies by season**

Passive Sampler Network: "Saturation Monitoring" (Professor Eric Fujita, Desert Research Institute)

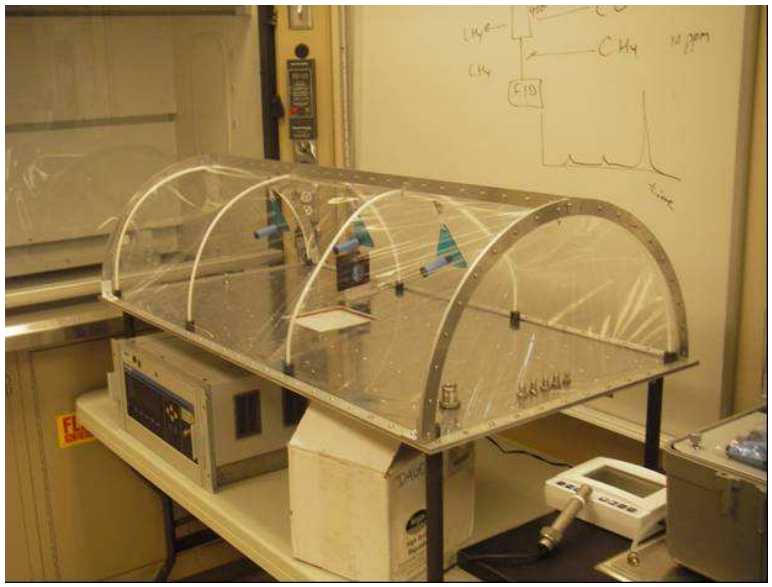
Objective: Test whether affordable, non-pump driven "passive" samplers are sensitive and accurate enough for community level use

- **Can they detect gradients?**
- **Can they accurately predict yearly averages from small sets of one- or two-week samples?**


DRI Core
DRI Core + continuous
DRI Passive only
SCAQMD (tentative)
Port of Los Angeles
Port of Long Beach
Revised 1/16/07
Note: DRI's sampling locations are preliminary and are subject to change.
Carson
West Carson
Res1
OCN
FD13
HES
Res2
Res3
Res4
Res5
Res6
Res7
Res8
W710
E710
BFL
SE
wilmington, CA
Res9
E110
RES10
Res11
FD49
AQMD
PLAB
Res12
Long Beach
Mormon Island
Terminal Island
Smith Island
Grissom, Island
White, Island
Freeman, Island
Chaffee, Island
© 2006 Europa Technologies
Image © 2006 DigitalGlobe
©2005 Google
Pointer 33°46'28.54" N 118°12'44.10" W elev 11 ft
Streaming 100%
Eye alt 50742 ft

Initial Results from Laboratory and Field Evaluations of the Passive Samplers

- Reproducible precision:
  - NO_2 and NO_X
  - SO_2
  - formaldehyde
  - acetaldehyde
- Still under evaluation:
  - benzene, toluene, ethylbenzene, xylene
  - 1,3-butadiene
  - hydrogen sulfide
  - acrolein



Particle Counter Network
(Dr. Katharine Moore and Professor Constantinos Sioutas, USC)

- **Network of 13 particle counters**
  - Particle number dominated by “ultrafine” particles (<0.1µm)
  - Ultrafine particles are a good indicator of combustion
  - 3 months each in winter and summer seasons
- **Objective**
  - Determining local versus regional influences, weather and seasonal impacts, etc.

USC Equipment

Free-standing weather-proof shelter with tripod on top (for weather station)

Particle counter

Mobile Monitoring Platform

(Kathleen Kozawa, UCLA; Dr. Scott Fruin, ARB; Professor Arthur Winer, UCLA)

- **Toyota RAV4 EV, zero-emission vehicle**
- **Measure gradients and find pollution "hot spots"**
- **Objective**
  - Spatial and temporal resolution with real-time and near real-time instrumentation

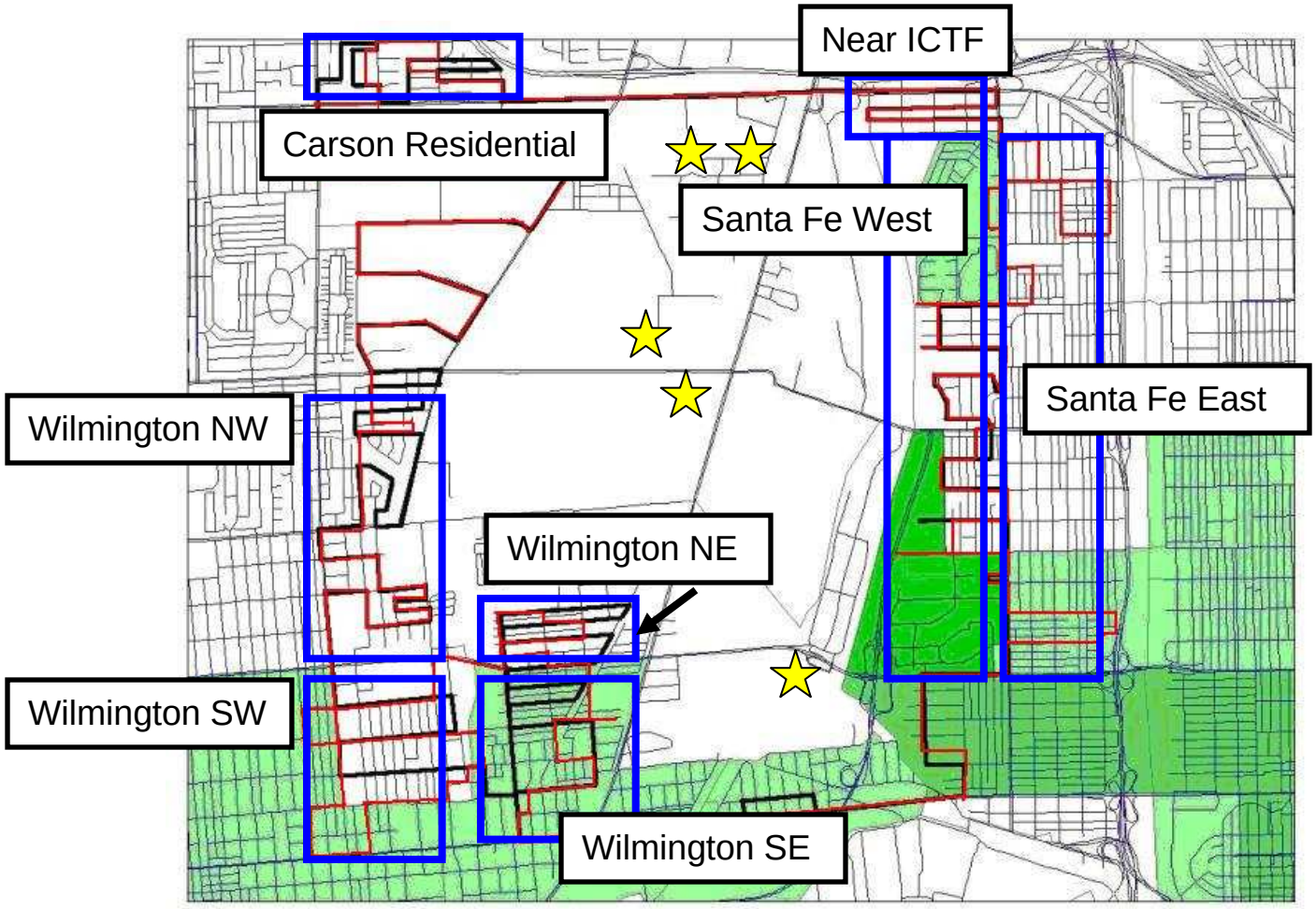
Measurement Parameters

- **Particles**
  - PM2.5 mass
  - black carbon
  - number and size distribution
  - particle-bound polycyclic aromatic hydrocarbons
- **Gases**
  - carbon monoxide (CO)
  - carbon dioxide (CO_2)
  - nitrogen oxides (NO_X)
  - total and speciated volatile organic compounds (VOC)
  - hydrogen sulfide (H_2S)
- **Meteorology**
- **Traffic documentation and location**

Basis for Route Selection

- **Sources**
  - Ports
  - Freeways
  - Refineries
  - Rail yards
  - Heavy-duty diesel truck traffic on surface streets
- **Route Development**
  - Source locations, prevailing winds
  - Community input
  - Low-income neighborhoods
  - Traffic counts
  - Dispersion modeling
  - Electric vehicle range, road access

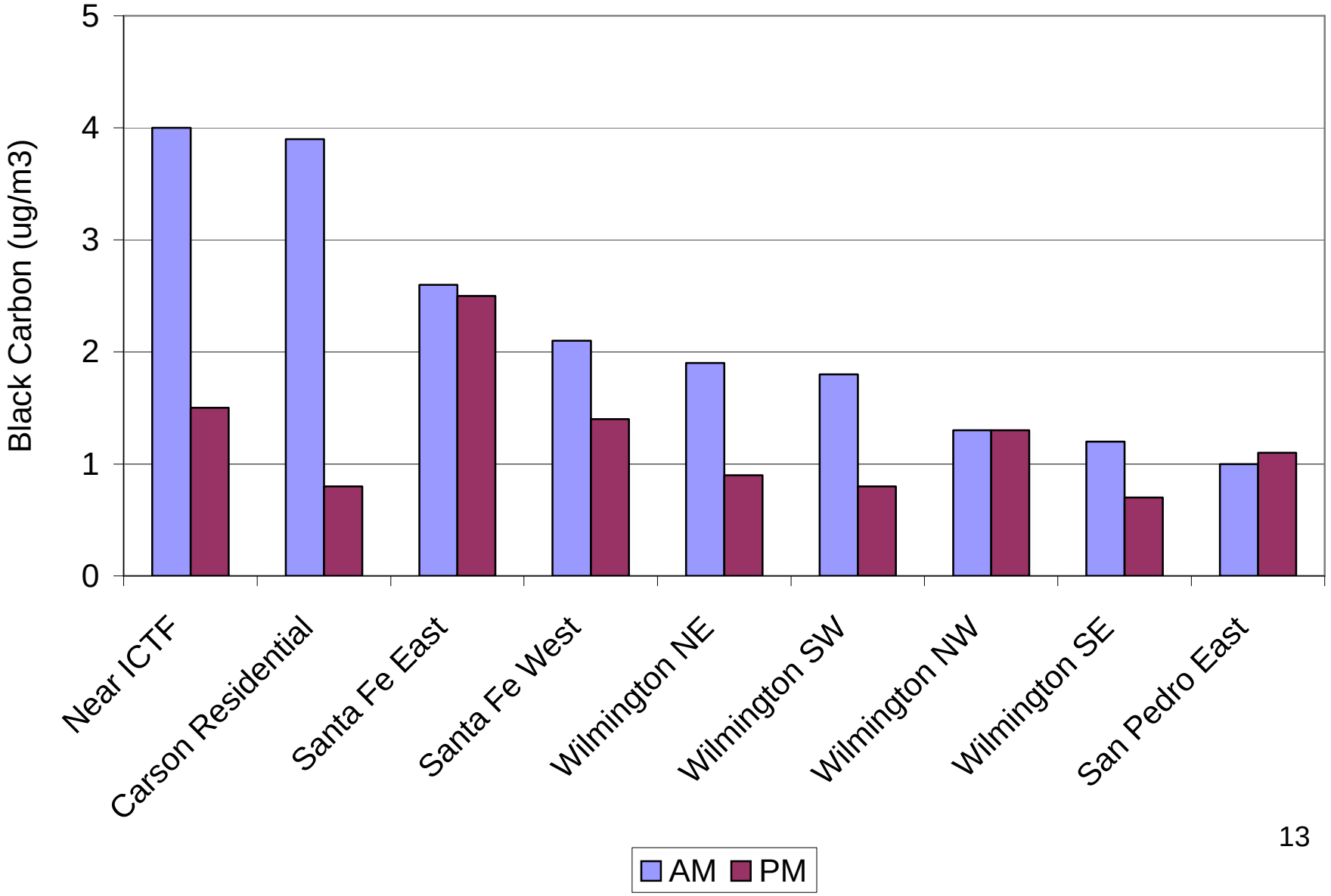
Residential Route: Identifying Pollution "Hot Spots"



= Low Income Areas = Petroleum Refinery

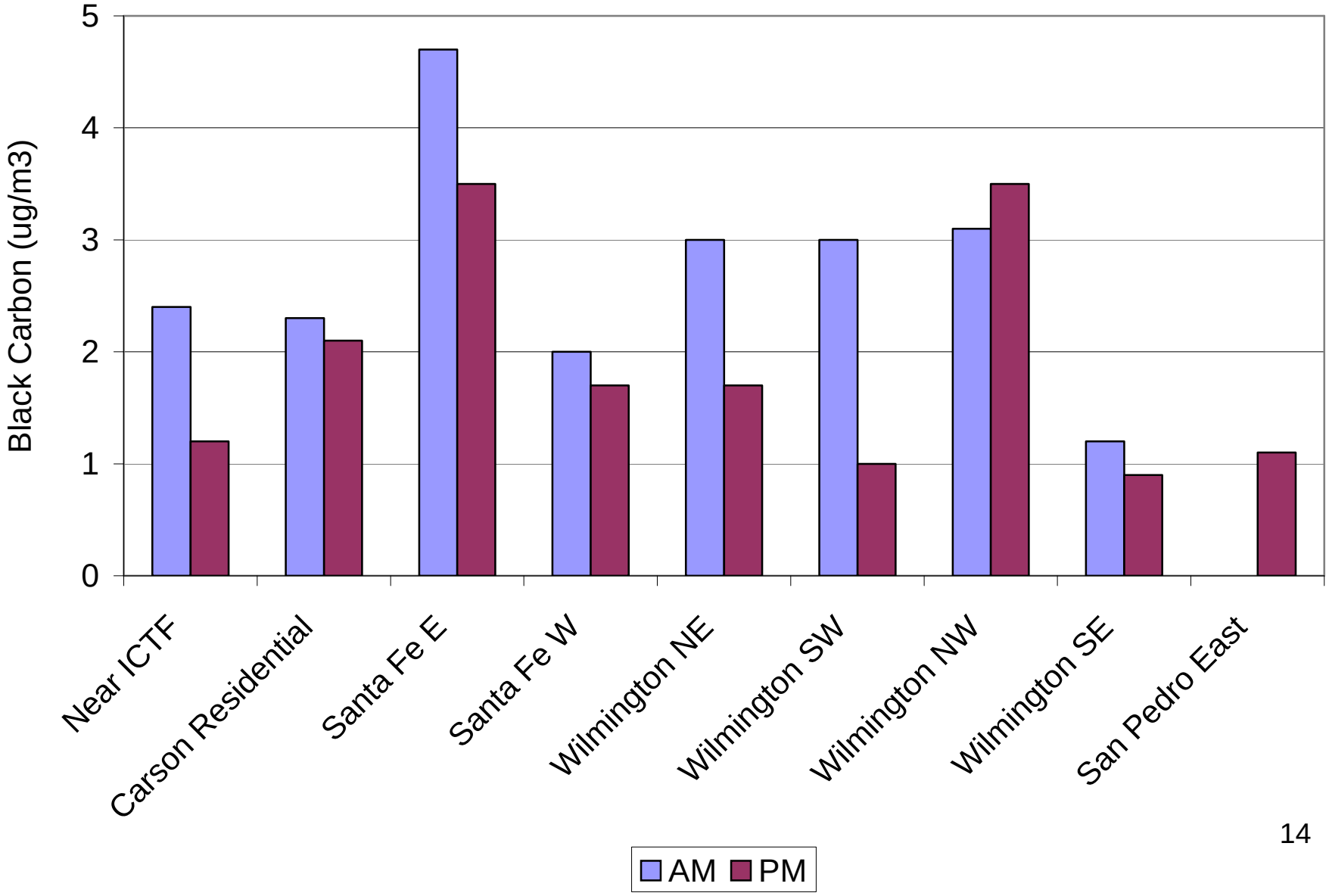
Effect of Location on “Hot Spots”

Sample Day 1



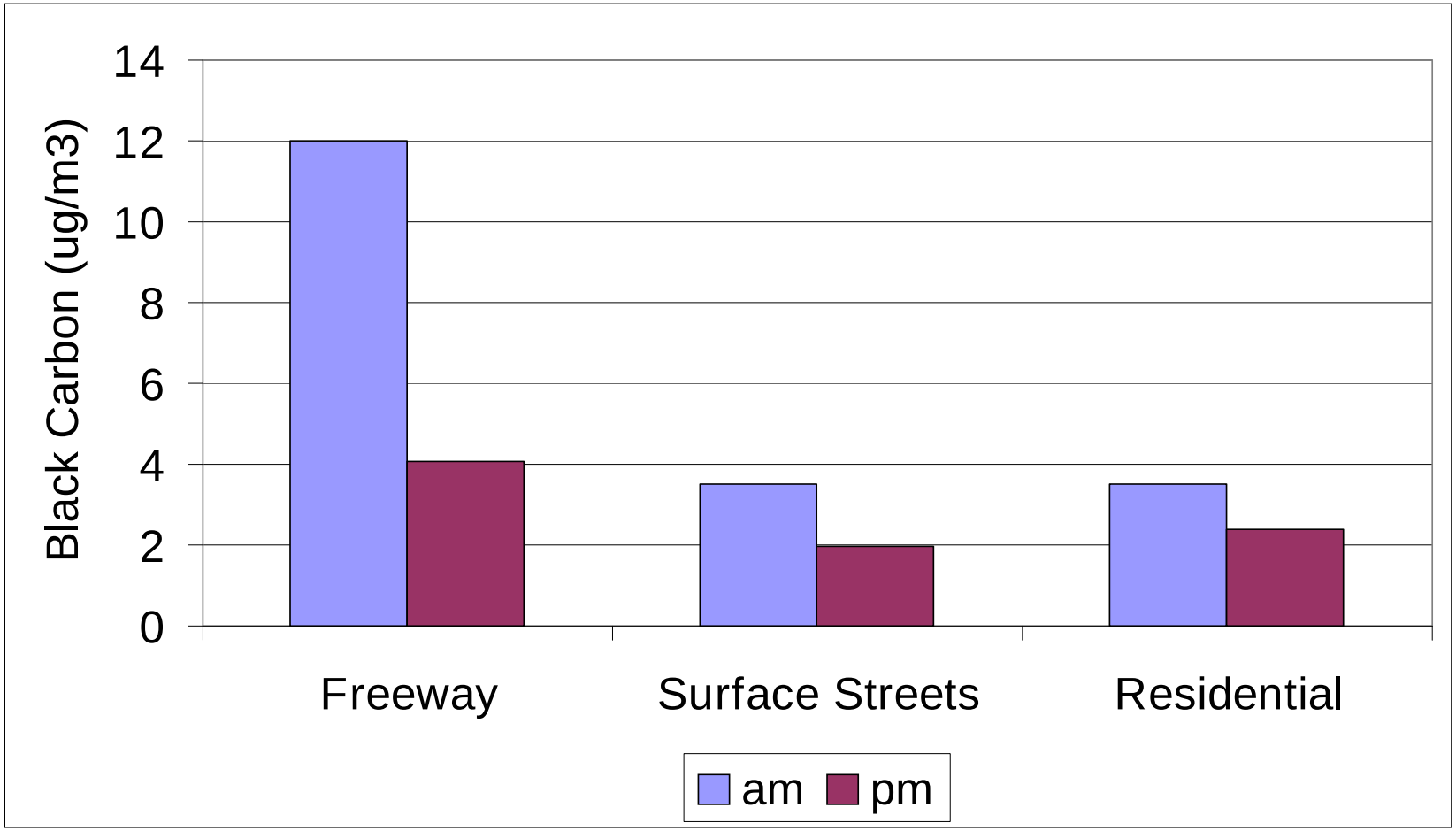
Effect of Location on “Hot Spots”

Sample Day 2



Effect of Road Type and Time of Day

Single Sample Day



Summary of Preliminary Results

- **Easy-to-use monitors good for some pollutants**
- **Ultrafine particle counters will help determine regional vs. local influences**
- **Mobile platform can identify pollution "hot spots"**
- **Variability in pilot results illustrates need for measurements throughout year**

Important Dates

- **Main Study Winter Sampling Start Date**
  - February 2007
- **Spring, Summer and Fall Monitoring**
  - April-May, July-August, and October 2007
- **Study Results Available in 2008**